Declaration Owner

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Product

ONE LP Demountable Partitions

EPD represents delivery of product to customers in North America.

Functional Unit

The functional unit is one square meter of demountable wall system installed and maintained for use over a 75-year period

EPD Number and Period of Validity

SCS-EPD-10435
EPD Valid May 20, 2025 through May 19, 2030

Product Category Rule

ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

Program Operator

SCS Global Services
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Declaration Owner:	Transwall
Address:	1220 Wilson Drive, West Chester, PA
Declaration Number:	SCS-EPD-10435
Declaration Validity Period:	EPD Valid May 20, 2025 through May 19, 2030
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA 2.4 software and the Ecoinvent v3.11 database
Product RSL:	30 yrs
Markets of Applicability:	North America
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Grave
LCIA Method and Version:	CML-IA and TRACI 2.1
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Product Category Rule:	ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services
PCR Review conducted by:	ISO Technical Committee
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and 21930.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. The owner of the declaration shall be liable for the underlying information and evidence; SCS shall not be liable with respect to manufacturer information, life cycle assessment data, and evidence supplied or made available to SCS.

1. Transwall

Transwall is a well-established developer and manufacturer of movable floor-to-ceiling and architectural (relocatable) wall systems. Founded in 1963 in the western suburbs of Philadelphia, the brand has positioned itself firmly in the relocatable wall segment of the contract interiors industry. Noted for its high quality products and superior services, Transwall has carved out a strong place for itself in eastern markets. It is also a long-standing and trusted supplier to the federal government with installations throughout the US and the world.

2. Product

2.1 PRODUCT DESCRIPTION

Table 1. *Product included in the EPD scope.*

Product	Description	Area (m^2)	Mass per unit area
ONE LP 42"w x 108"h (1.07m x 2.74m)	Floor to ceiling glass wall product consisting of a low profile lightweight aluminum skeleton & butt-joint glass - 3 1/8" thick with 1" vertical and horizontal elements providing a slim profile.	2.93	35.61 kg/m^2

2.2 APPLICATION

The demountable partition products provide the primary function of partitioning interior spaces.

2.3 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The life cycle phases included in the product system boundary are shown below.

Cut-off and allocation procedures are described below and conform to the PCR and ISO standards. The assessment follows the attributional LCA approach.

Table 2. *Life cycle phases included in the product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B1	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	**MND**

X = Module Included | MND = Module Not Declared

2.4 TECHNICAL DATA

Technical specifications and product performance results for the demountable partition products can be found on the manufacturer's website (https://www.transwall.com).

2.5 MATERIAL COMPOSITION

The products are made primarily from fabricated aluminum and steel components, glass and various plastics and hardware.

Table 3. *Material content for the products in kg per reference flow and as a percentage of total mass.*

Material	ONE LP	
	Mass (kg)	%
Product		
Aluminum	12.0	12%
Steel	8.16×10^{-3}	0.0078%
Glass	90.7	87%
Plastic	0.558	0.54%
Open Cell Foam	0.752	0.72%
Other	9.80×10^{-2}	0.094%
Total Product	**104**	**100%**

No chemicals regulated by the Resource Conservation and Recovery Act (RCRA) were identified in the product or product components. There are no releases of such substances associated with the production, use or maintenance of the products.

2.6 MANUFACTURING

The products are manufactured at the Transwall production facility in the United States. The manufacturer provided primary data for their annual production, resource use and electricity consumption and waste generation at the facility. Electricity consumption is modeled using Ecoinvent datasets for the applicable regional electricity grid resource mix. No green power sources or CO_2 certificates are included in the present study.

The manufacturer provided material-specific scrap rates from manufacturing of the products, which is accounted for within the raw material extraction and processing and upstream transport phases of the assessment. Disposal of manufacturing scrap, via landfilling, is accounted for in the manufacturing stage.

2.7 PACKAGING

The products are packaged for shipment using adhesive and plastic wrap.

Table 4. *Material content for the product packaging, in kg per reference flow and as a percentage of total mass.*

Material	ONE LP	
	Mass (kg)	%
Plastic film	1.81×10^{-2}	80%
Adhesive	4.54×10^{-3}	20%
Total Packaging	**2.27×10^{-2}**	**100%**

2.8 PRODUCT INSTALLATION

The impacts associated with the production, transport and installation of the glass components of the demountable partitions are included in the product installation life cycle phase. Impacts associated with the production and disposal of the product packaging are also included in this phase. The VOC emissions associated with the installation, use and maintenance of the products are negligible.

2.9 USE CONDITIONS

No special conditions of use are noted.

2.10 PRODUCT REFERENCE SERVICE LIFE AND BUILDING ESTIMATED SERVICE LIFE

The Reference Service Life (RSL) of the product is based on the manufacturer's estimated product lifetime and is summarized in Table 5 below. The building Estimated Service Life (ESL) is 75 years, consistent with the PCR.

2.11 RE-USE PHASE

The products are not reused at end-of-life.

2.12 DISPOSAL

No specific data were available regarding the recycling rate of materials in the product at end-of-life. Assumptions for the product end-of-life are based on regional statistics regarding municipal solid waste generation and disposal. Material recycling rates are based on the US EPA's disposal statistics for municipal solid waste (MSW) for 2018.

2.13 FURTHER INFORMATION

Further information on the product can be found on the manufacturers' website at https://www.transwall.com.

3. LCA: Calculation Rules

3.1 FUNCTIONAL UNIT

The functional unit used in the study is defined as 1 m^2 of demountable partition maintained for 75 years, consistent with the PCR. The corresponding reference flow for each product system is presented in Table 5. For the present assessment, a reference service lifetime (RSL) corresponding to the manufacturer's estimated lifetime is assumed. The total number of required product lifecycles during the 75-year period over which the product system is modeled is also summarized for the products in Table 5.

Table 5. *Reference flows and RSL for the demountable partition products.*

Product	Functional Unit	Reference Flow (kg)	Reference Service Lifetime (yrs)	Replacement Cycle	Total # of Life Cycles
ONE LP	1 m^2 of demountable partition maintained for 75 years	104.2	30	1.5	2.5

3.2 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-grave, including raw material extraction and processing, transportation, product manufacture, product delivery, installation and use, and product disposal. The life cycle phases included in the EPD scope are described in Table 6 and illustrated in Figure 1.

Table 6. *The modules and unit processes included in the scope for the Transwall interior demountable partition products.*

Module	Module description from the PCR	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other, recovery processes from secondary fuels	Extraction and processing of raw materials for the demountable partition components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facilities
A3	Manufacturing, including ancillary material production	Manufacturing of products and packaging (including upstream unit processes)
A4	Transport (to the building site)	Transport of product (including packaging) to the building site
A5	Construction-installation process	Impacts from the installation of the product are assumed negligible. Impacts from the production, transport and disposal of waste material associated with installation are included in this phase in addition to impacts from packaging disposal. This phase also includes the production, tempering and transport of glass components of the demountable partition.
B1	Product use	There are no impacts from the use of the demountable partition in a commercial building setting.
B2	Product maintenance	Maintenance of products over the 75-year ESL, including periodic cleaning. Impacts from product maintenance are assumed negligible
B3	Product repair	The products are not expected to require repair over its lifetime
B4	Product replacement	The materials and energy required for replacement of the product over the 75-year ESL of the assessment are included in this phase
B5	Product refurbishment	The products are not expected to require refurbishment over their lifetime
B6	Operational energy use by technical building systems	There is no operational energy use associated with the use of the product
B7	Operational water uses by technical building systems	There is no operational water use associated with the use of the product
C1	Deconstruction, demolition	Demolition of the product is accomplished using hand tools with no associated emissions and negligible impacts
C2	Transport (to waste processing)	Transport of the product to waste treatment at end-of-life
C3	Waste processing for reuse, recovery and/or recycling	The products are disposed of by recycling, landfilling or incineration which require no waste processing
C4	Disposal	Disposal of the product in a municipal landfill or incineration
D	Reuse-recovery-recycling potential	Module Not Declared

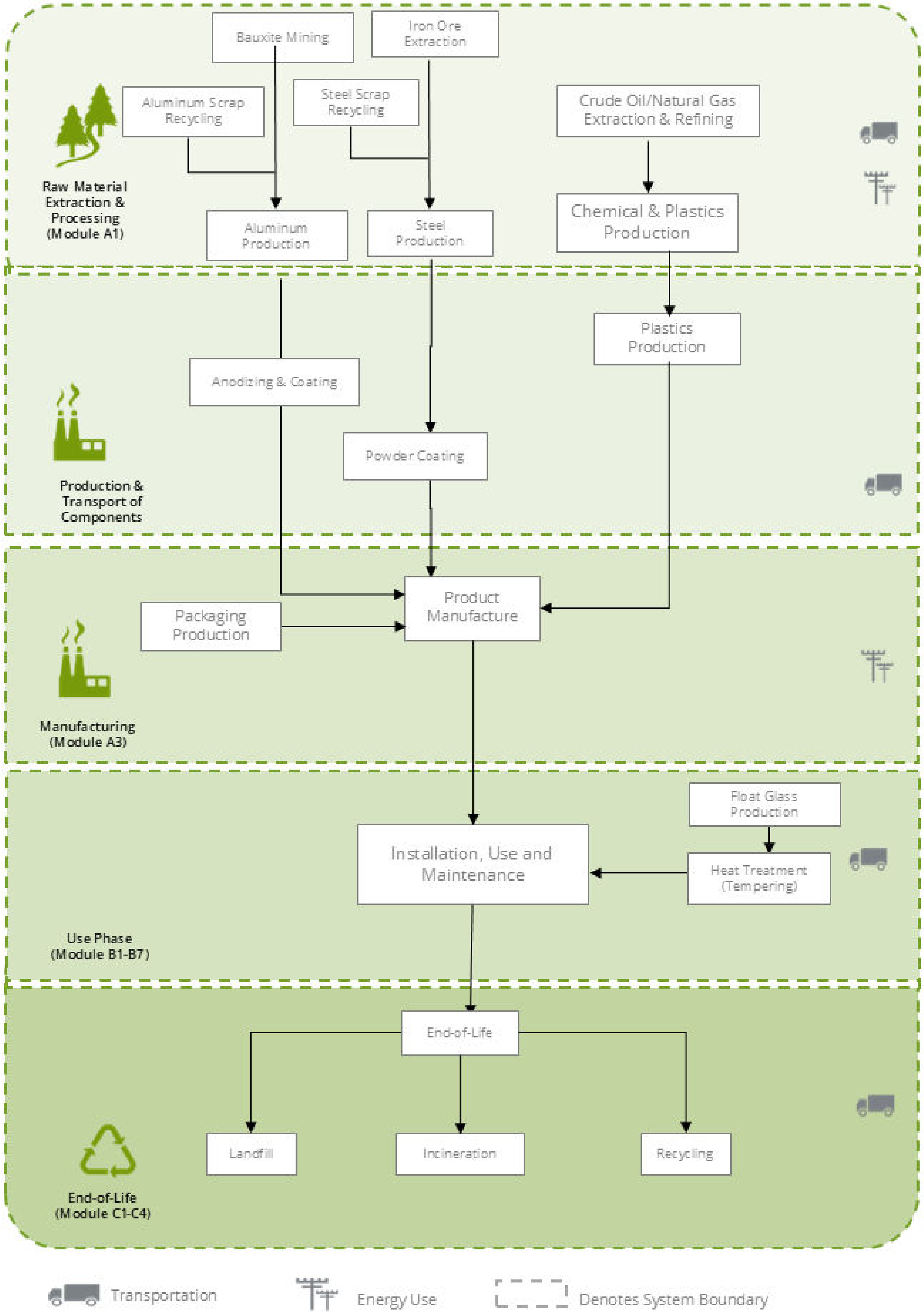

Figure 1. *Flow Diagram for the life cycle of the product system.*

3.3 PRODUCT SPECIFIC CALCULATION FOR USE PHASE

There are no impacts associated with the use of the products.

3.4 UNITS

All data and results are presented using SI units.

3.5 ESTIMATES AND ASSUMPTIONS

- The Reference Service Life (RSL) of the products was modeled based on information provided by the manufacturer assuming their products are installed and maintained as recommended and used for the specific application noted.
- The *Transwall* manufacturing facility is located in West Chester, PA. An Ecoinvent inventory dataset was modified to reflect the eGRID 2022 energy mix for the RFCE NERC subregion in order to estimate resource use and emissions from electricity use at the manufacturing facility.
- Electricity and resource use (natural gas, propane and water) at the production facility was allocated to the demountable partition products based on product mass utilizing production data for calendar year 2024 provided by the manufacturer.
- Primary data for upstream component fabrication were not available. Representative LCI datasets from the ecoinvent database were used to model processing for aluminum, steel, glass, and plastic material components.
- The Reference Service Life (RSL) of the products was modeled based on information provided by the manufacturer assuming their products are installed and maintained as recommended and used for the specific application noted.
- For end-of-life, disposal of the product and product packaging is modeled based on 2018 statistics for municipal solid waste generation and disposal in the United States, from the US Environmental Protection Agency. These data provide recycling rate estimates for household and municipal waste, durable and non-durable goods, as well as for packaging and containers.
- For final disposal of the product and packaging materials at end-of-life, all materials are assumed to be transported 100 miles (161 km) by diesel truck to either a landfill, incineration facility, or material reclamation facility (for recycling). Datasets representing disposal in a landfill and waste incineration are from Ecoinvent.
- Modeling of recycled materials follows the recycled content method (also known as 100-0 method or cut-off method) whereby only the burdens of reprocessing the waste material are allocated to the system from the use of the recycled material.

The PCR requires the results for several inventory flows related to construction products to be reported including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted considering this limitation.

3.6 CUT-OFF RULES

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

3.7 DATA SOURCES

Primary data were provided by Transwall for their manufacturing facility. The source of secondary LCI data is the Ecoinvent database.

Table 7. *Data sources for the Transwall product system.*

Component	Dataset	Data Source	Publication Date
PRODUCT			
Aluminum			
Aluminum, pre-consumer recycled	market for aluminium scrap, new | aluminium scrap, new | Cutoff, S/RoW	EI v3.11	2024
Aluminum, post-consumer recycled	market for aluminium, cast alloy | aluminium, cast alloy | Cutoff, S/GLO	EI v3.11	2024
Aluminum, primary	market for aluminium, primary, ingot | aluminium, primary, ingot | Cutoff, S/IAI Area, North America	EI v3.11	2024
Powder coating	powder coating, aluminium sheet | powder coat, aluminium sheet | Cutoff, S/RoW	EI v3.11	2024
Anodizing	anodising, aluminium sheet | anodising, aluminium sheet | Cutoff, S/RoW	EI v3.11	2024
Metal working	metal working, average for aluminium product manufacturing | metal working, average for aluminium product manufacturing | Cutoff, S/RoW	EI v3.11	2024
Steel			
Steel - BOF	steel production, converter, low-alloyed | steel, low-alloyed | Cutoff, S/RoW	EI v3.11	2024
Steel - EAF	steel production, electric, low-alloyed | steel, low-alloyed | Cutoff, S/RoW	EI v3.11	2024
Metal working	metal working, average for steel product manufacturing | metal working, average for steel product manufacturing | Cutoff, S/RoW	EI v3.11	2024
Powder coating	powder coating, steel | powder coat, steel | Cutoff, S/RoW	EI v3.11	2024
Plastics			
PVC	polyvinylchloride production, bulk polymerisation | polyvinylchloride, bulk polymerised | Cutoff, S/RoW	EI v3.11	2024
PS	polystyrene production, high impact | polystyrene, high impact | Cutoff, S/RoW	EI v3.11	2024
PC	polycarbonate production | polycarbonate | Cutoff, S/RoW	EI v3.11	2024
PUR foam	market for polyurethane, flexible foam | polyurethane, flexible foam | Cutoff, S/RoW	EI v3.11	2024
Injection molding	injection moulding | injection moulding | Cutoff, S/RoW	EI v3.11	2024
Other			
Silicone	silicone product production | silicone product | Cutoff, S/RoW	EI v3.11	2024
Powder coat	coating powder production | coating powder | Cutoff, S/RoW	EI v3.11	2024
PACKAGING			
Plastics	production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.11	2024
Adhesive	polyurethane adhesive production | polyurethane adhesive | Cutoff, S/GLO	EI v3.11	2024
INSTALLATION			
Glass	flat glass production, uncoated | flat glass, uncoated | Cutoff, S/RoW	EI v3.11	2024
Tempering	tempering, flat glass | tempering, flat glass | Cutoff, S/RoW	EI v3.11	2024
RESOURCES			
Grid electricity	market for electricity, medium voltage | electricity, medium voltage | Cutoff, U - RFCE/US-RFC	EI v3.11	2024
Natural gas	market group for heat, district or industrial, natural gas | heat, district or industrial, natural gas | Cutoff, S/GLO	EI v3.11	2024
Propane	propane, burned in building machine | propane, burned in building machine | Cutoff, S/GLO	EI v3.11	2024
Water	tap water production, conventional treatment | tap water | Cutoff, S/RoW	EI v3.11	2024
WASTE DISPOSAL			
Landfill	treatment of waste paperboard, sanitary landfill | waste paperboard | Cutoff, S/RoW	EI v3.11	2024
	treatment of waste glass, sanitary landfill | waste glass | Cutoff, S/GLO	EI v3.11	2024

Component	Dataset	Data Source	Publication Date
	treatment of scrap steel, inert material landfill | scrap steel | Cutoff, S/RoW	EI v3.11	2024
	treatment of municipal solid waste, sanitary landfill | municipal solid waste | Cutoff, S/RoW	EI v3.11	2024
	treatment of waste polyvinylchloride, sanitary landfill | waste polyvinylchloride | Cutoff, S/RoW	EI v3.11	2024
Incineration	treatment of municipal solid waste, incineration | municipal solid waste | Cutoff, S/RoW	EI v3.11	2024
	treatment of waste paperboard, municipal incineration | waste paperboard | Cutoff, S/RoW	EI v3.11	2024
	treatment of waste glass, municipal incineration | waste glass | Cutoff, S/RoW	EI v3.11	2024
	treatment of scrap aluminium, municipal incineration | scrap aluminium | Cutoff, S/RoW	EI v3.11	2024
	treatment of waste polyvinylchloride, municipal incineration | waste polyvinylchloride | Cutoff, S/RoW	EI v3.11	2024
	treatment of scrap steel, municipal incineration | scrap steel | Cutoff, S/RoW	EI v3.11	2024
Waste water	treatment of wastewater, average, wastewater treatment | wastewater, average | Cutoff, S/RoW	EI v3.11	2024
TRANSPORTATION			
	transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.11	2024

3.8 DATA QUALITY

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 8. *Data quality assessment for the product system.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 5 years old. All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2024.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Electricity use for product manufacture is modeled using representative data for the US. Surrogate data used in the assessment are representative of global or European operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing disposal processes are based on US statistics.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the demountable partition products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards the most recent data where available. Different portions of the product life cycle are equally considered; however, it must be noted that final disposition of the product is based on assumptions of current average practices in the United States.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	Data representing energy use at Transwall's manufacturing facility represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI data, Ecoinvent v3.11 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for upstream operations was not available for all suppliers and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

3.9 PERIOD UNDER REVIEW

Manufacturer-supplied data (primary data) are based on annual production for 2024.

3.10 ALLOCATION

Resource use at Transwall's production facility (e.g., water and energy) was allocated to the product based on the product mass as a fraction of the total facility production volume (i.e., mass-based allocation). Based on the location, electricity use at the manufacturing facility was modeled using inventory datasets modified to reflect the eGRID energy mix for the applicable EPA NERC subregion.

Impacts from transportation were attributed to the products based on the mass of material and distance transported.

3.11 COMPARABILITY

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

4. LCA: Scenarios and Additional Technical Information

Delivery and Installation stage (A4 - A5)

Distribution of the products to the point of installation is included in the assessment. Transportation parameters for modeling product distribution are summarized in Table 9. Production-weighted average distances by transport mode were used to represent product distribution in North America.

Table 9. *Distribution parameters for the One LP demountable partition products.*

Parameter	Unit	Value
Ground transport		
Fuel type	-	Diesel
Liters of fuel	L/100km	18.7
Vehicle type	-	Diesel truck
Capacity utilization	%	76
Product Name	**Gross mass transported[1] (kg)**	**Road Transport Distance (km)**
ONE LP	13.47	1,701

[1] Including packaging.

The impacts associated with the production, transport and installation of the glass components of the demountable partition are included in the product installation life cycle phase. Impacts associated with the production of the product packaging are also included in the installation phase.

The VOC emissions associated with the installation, use and maintenance of the products are negligible.

Impacts associated with the disposal of packaging materials are also included in the installation life cycle phase. Assumed recycling rates for packaging component materials are based on the PCR requirements. Table 10 summarizes the relevant parameters for the product installation phase including wastes associated with product packaging.

Table 10. *Installation parameters for the demountable partition products, per 1 m^2.*

Parameter		ONE LP
Ancillary materials – tempered glass (kg)		90.7
Net freshwater consumption (m^3)		0.00
Electricity consumption (kWh)		0.00
Product loss per functional unit (kg)		0.00
Waste materials generated by product installation (kg)		2.27×10^{-2}
Output materials resulting from on-site waste processing (kg)		n/a
Mass of packaging waste (kg)	Plastic	1.81×10^{-2}
	Adhesive	4.54×10^{-3}
Biogenic carbon contained in packaging (kg CO_2)		0.00
Direct emissions (kg)		0.00

Use and Maintenance stage (B1; B2)

The product system's use and maintenance life cycle phases were modeled based on the estimated building service life (ESL) of each of the products. Impacts from maintenance and cleaning of the products are assumed negligible. No impacts are associated with the use of the product.

Repair/Refurbishment stage (B3; B5)

Product repair and refurbishment are not relevant during the lifetime of the product.

Replacement stage (B4)

The materials and energy required for replacement of the product over the 75-year estimated service lifetime of the assessment are included in this stage. Modeling parameters for the product replacement stage are summarized in Table 11. Impacts associated with the production, transport, waste processing, and disposal of all materials required for the replacement of the product over the 75-year assessment period are included in this life cycle phase.

Table 11. *Product replacement parameters for the products, per reference flow.*

Parameter	Units	Value
Reference service life	Years	30
Replacement cycle	-	1.5
Energy input	kWh	0
Freshwater consumption	m^3	0
Ancillary materials	kg	Negligible
Replacement parts	kg	117
Direct emissions	kg	0

Building operation stage (B6 – B7)

There is no operational energy or water use associated with the use of the product.

Disposal stage (C1 - C4)

The disposal stage includes removal of the products (C1); transport of the products to waste treatment facilities (C2); waste processing (C3); and associated emissions as the product degrades in a landfill or is burned in an incinerator (C4). For the demountable partition products, no emissions are generated during demolition (C1) while no waste processing (C3) is required for incineration or landfill disposal.

Transportation of waste materials at end-of-life (C2) assumes a 100 mile (~161 km) average distance to disposal, consistent with the PCR. The recycling rates used for the product packaging are based on the PCR. The relevant disposal parameters are summarized in Table 12.

Table 12. *End-of-life disposal scenario parameters for the demountable partition products.*

Parameter		Value
Assumptions for scenario development		EPA 2018 MSW
Collection process		-
Collected with mixed construction waste (kg)		35.6
Recovery		n/a
Disposal	Recycled (kg)	2.82
	Landfill (kg)	26.2
	Incineration (kg)	6.56
Removals of biogenic carbon (kg CO_2 eq)		n/a

5. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. All LCA results are stated to three significant figures in agreement with the PCR and therefore the sum of the total values may not exactly equal 100%.

The following environmental impact category indicators are reported using characterization factors based on the U.S. EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts – TRACI 2.1 and CML-IA.

CMLI-A Impact Category	Unit	TRACI 2.1 Impact Category	Unit
Global Warming Potential (GWP)	kg CO_2 eq	Global Warming Potential (GWP)	kg CO_2 eq
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq	Ozone Depletion Potential (ODP)	kg CFC 11 eq
Acidification Potential of soil and water (AP)	kg SO_2 eq	Acidification Potential (AP)	kg SO_2 eq
Eutrophication Potential (EP)	kg $(PO_4)^{3-}$ eq	Eutrophication Potential (EP)	kg N eq
Photochemical Oxidant Creation Potential (POCP)	kg C_2H_4 eq	Smog Formation Potential (SFP)	kg O_3 eq
Abiotic depletion potential for non-fossil resources (ADPE)	kg Sb eq	Fossil Fuel Depletion Potential (FFD)	MJ Surplus, LHV
Abiotic depletion potential for fossil resources (ADPF)	MJ, LHV	-	-

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes.

The following inventory parameters, specified by the PCR, are also reported.

Resources	Unit	Waste and Outflows	Unit
RPR_E: Renewable primary resources used as energy carrier (fuel)	MJ, LHV	**HWD:** Hazardous waste disposed	kg
RPR_M: Renewable primary resources with energy content used as material	MJ, LHV	**NHWD:** Non-hazardous waste disposed	kg
$NRPR_E$: Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	**HLRW:** High-level radioactive waste, conditioned, to final repository	kg
$NRPR_M$: Non-renewable primary resources with energy content used as material	MJ, LHV	**ILLRW:** Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
SM: Secondary materials	kg	**CRU:** Components for re-use	kg
RSF: Renewable secondary fuels	MJ, LHV	**MR:** Materials for recycling	kg
NRSF: Non-renewable secondary fuels	MJ, LHV	**MER:** Materials for energy recovery	kg
RE: Recovered energy	MJ, LHV	**EE:** Recovered energy exported from the product system	MJ, LHV
FW: Use of net freshwater resources	m^3	-	-

Modules B1, B2, B3, B5, B6, and B7 are not associated with any impact and are therefore declared as zero. In addition, modules C1 and C3 are likewise not associated with any impact as the product is manually deconstructed. Additionally, as the products do not contain bio-based materials, biogenic carbon emissions and removals are not declared. Module D is not declared. In the interest of space and table readability, these modules are not included in the results presented below.

Table 13. *Life Cycle Impact Assessment results for the Transwall products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* **(ONE LP)**

Impact Category	A1	A2	A3	A4	A5	B4	C2	C4
CML								
GWP (kg CO_2 eq)	50.8	7.68	2.87	8.52	50.8	194	7.97	0.640
	16%	2.4%	0.89%	2.6%	16%	60%	2.5%	0.2%
AP (kg SO_2 eq)	0.309	2.54×10^{-2}	4.79×10^{-3}	2.82×10^{-2}	0.357	1.14	2.99×10^{-2}	2.09×10^{-3}
	16%	1.3%	0.25%	1.5%	19%	60%	1.6%	0.11%
EP (kg $(PO_4)^{3-}$ eq)	0.104	6.42×10^{-3}	3.64×10^{-3}	7.13×10^{-3}	5.16×10^{-2}	0.280	6.95×10^{-3}	7.15×10^{-3}
	22%	1.4%	0.78%	1.5%	11%	60%	1.5%	1.5%
POCP (kg C_2H_4 eq)	2.03×10^{-2}	1.22×10^{-3}	3.34×10^{-4}	1.36×10^{-3}	1.30×10^{-2}	5.65×10^{-2}	1.34×10^{-3}	1.22×10^{-4}
	22%	1.3%	0.35%	1.4%	14%	60%	1.4%	0.13%
ODP (kg CFC-11 eq)	1.43×10^{-5}	1.02×10^{-7}	3.98×10^{-8}	1.13×10^{-7}	4.53×10^{-7}	2.26×10^{-5}	9.53×10^{-8}	8.93×10^{-9}
	38%	0.27%	0.11%	0.3%	1.2%	60%	0.25%	0.024%
ADPF (MJ eq)	524	108	38.5	120	550	2,180	103	8.54
	14%	3%	1.1%	3.3%	15%	60%	2.8%	0.24%
ADPE (kg Sb eq)	1.11×10^{-4}	2.48×10^{-5}	1.43×10^{-6}	2.76×10^{-5}	2.36×10^{-4}	6.07×10^{-4}	2.68×10^{-6}	5.93×10^{-7}
	11%	2.5%	0.14%	2.7%	23%	60%	0.26%	0.059%
TRACI								
GWP (kg CO_2 eq)	50.8	7.68	2.83	8.52	50.7	194	7.97	0.640
	16%	2.4%	0.88%	2.6%	16%	60%	2.5%	0.2%
AP (kg SO_2 eq)	0.307	3.04×10^{-2}	5.36×10^{-3}	3.37×10^{-2}	0.364	1.17	3.83×10^{-2}	2.57×10^{-3}
	16%	1.6%	0.27%	1.7%	19%	60%	2%	0.13%
EP (kg N eq)	0.216	7.21×10^{-3}	8.17×10^{-3}	8.00×10^{-3}	6.75×10^{-2}	0.494	3.96×10^{-3}	1.82×10^{-2}
	26%	0.88%	0.99%	0.97%	8.2%	60%	0.48%	2.2%
SFP (kg O_3 eq)	3.13	0.767	0.107	0.851	4.79	16.3	1.16	6.75×10^{-2}
	12%	2.8%	0.39%	3.1%	18%	60%	4.3%	0.25%
ODP (kg CFC-11 eq)	3.94×10^{-5}	1.34×10^{-7}	5.66×10^{-8}	1.49×10^{-7}	6.23×10^{-7}	6.07×10^{-5}	1.30×10^{-7}	1.17×10^{-8}
	39%	0.13%	0.056%	0.15%	0.62%	60%	0.13%	0.012%
FFD (MJ surplus)	43.3	15.3	5.70	17.0	77.8	264	15.5	1.22
	9.8%	3.5%	1.3%	3.9%	18%	60%	3.5%	0.28%

Table 14. *Resource use and waste flows for the Transwall products over a 75-yr time horizon. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits* **(ONE LP)**

Parameter	A1	A2	A3	A4	A5	B4	C2	C4
Resources								
RPR_E (MJ)	129	1.39	0.845	1.54	21.1	231	0.450	0.127
	33%	0.36%	0.22%	0.4%	5.5%	60%	0.12%	0.033%
RPR_M (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0%	0%	0%	0%	0%	0%	0%	0%
$NRPR_E$ (MJ)	545	109	49.2	121	561	2,250	103	8.67
	15%	2.9%	1.3%	3.2%	15%	60%	2.8%	0.23%
$NRPR_M$ (MJ)	8.85	0.00	0.229	0.00	0.00	13.6	0.00	0.00
	39%	0%	1%	0%	0%	60%	0%	0%
SM (kg)	2.43	0.00	0.00	0.00	0.00	3.64	0.00	0.00
	40%	0%	0%	0%	0%	60%	0%	0%
RSF/NRSF (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW (m^3)	2.42	8.33×10^{-2}	0.869	9.25×10^{-2}	1.12	6.96	3.74×10^{-2}	1.04×10^{-2}
	21%	0.72%	7.5%	0.8%	9.7%	60%	0.32%	0.09%
Wastes								
HWD (kg)	5.53×10^{-3}	7.06×10^{-4}	2.06×10^{-4}	7.84×10^{-4}	2.89×10^{-3}	1.64×10^{-2}	7.26×10^{-4}	5.76×10^{-5}
	20%	2.6%	0.76%	2.9%	11%	60%	2.7%	0.21%
NHWD (kg)	2.20	5.30	0.281	5.89	7.81	72.5	0.493	26.4
	1.8%	4.4%	0.23%	4.9%	6.5%	60%	0.41%	22%
HLRW (kg)	1.26×10^{-4}	6.53×10^{-6}	3.16×10^{-5}	7.25×10^{-6}	5.04×10^{-5}	3.36×10^{-4}	2.20×10^{-6}	5.27×10^{-7}
	22%	1.2%	5.6%	1.3%	9%	60%	0.39%	0.094%
ILLRW (kg)	3.14×10^{-4}	1.55×10^{-5}	1.26×10^{-4}	1.73×10^{-5}	1.16×10^{-4}	8.93×10^{-4}	5.05×10^{-6}	1.31×10^{-6}
	21%	1%	8.5%	1.2%	7.8%	60%	0.34%	0.088%
CRU (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MR (kg)	0.00	0.00	0.00	0.00	8.43×10^{-4}	4.24	0.00	2.82
	0%	0%	0%	0%	0.012%	60%	0%	40%
MER (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE (MJ)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

6. LCA: Interpretation

The contributions to total impact indicator results are dominated by the product replacement phase (B4) of the assessment. Of the remaining life cycle phases, with few exceptions, the contributions to total indicator impacts are dominated by the raw material extraction and processing stages followed by product installation. Product distribution and upstream material transport are generally the next highest contributors to overall impacts while contributions from the remaining life cycle stages are minimal.

7. References

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